

Claims

1 5b
2 2. An information input processing, gesture-key mapping
3 2.1
4 cameras, one or more memories with CPU connected to the
5 cameras, and processes running in the CPU that associates
6 gesture movements with typing and produce gesture
associated textual output.

1 5b
2 3. The gesture-key mapping system as in claim 1, where a
3 2.1 feedback is provided to the user on what kind of keys are
associated with the user's gestures.

1 3. The gesture-key mapping system as in claim 2, where
2 the feedback is provided using one or more of the
3 following: displaying keys on a display, playing sounds
4 labels for keys, displaying image indicators on a
5 display, playing special sound indicators, projecting the
6 keyboard to any surface, and displaying picture of the
7 keyboard with user's hands.

1 4. The system as in claim 1, where the gesture-key
2 processing is provided using the following modules:

3
4 a) a gesture capturing module that captures gestures
5 through camera sensors;

6
7 b) a gesture classifier module that classifies
8 gestures into classes of gesture movements;

9

c) an associator module for associating gesture classes or sequence of gesture classes with one or several most probable keys; and

d) an integrator module that integrate sequence of candidate of most probable keys into unique output key sequence.

5. The system as in claim 4, where the integrator module includes one or more of the following:

a) language module component that estimate probabilities of word strings corresponding to key candidate sequences;

b) character frequency module that estimate probabilities of character strings corresponding key candidate sequences;

c) confusable matrix that estimate how often correct gesture classes are confusable with another gesture classes;

d) gesture classes probability model that estimate probability of observing a string of gesture classes given a sequence of gesture frames;

e) computation of a probability of production a sequence of keys given a string of gesture frames;

f) generation of a lattice of sequences of keys given sequence of gesture frames;

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1 12. A method according to Claim 11, wherein the step of
2 providing feedback includes the step of displaying an
3 image of typing keys associated with the gestures.

1 13. A method according to Claim 10, further comprising
2 the step of generating an image of a keyboard; and
3 wherein the step of making typing gestures includes the
4 step of making typing gestures relative to said image as
5 if said image were a real keyboard.

1 14. A method according to Claim 10, wherein the producing
2 step includes the step of classifying gestures into
3 classes of gesture movement.

1 15. A method according to Claim 14, wherein the producing
2 step further includes the step of associating gesture
3 classes with individual typing keys.

1 16. A method according to Claim 10, further comprising
2 providing training data in words or sentences with
3 certain timing data.

1 *Sub* 17. A typing system using a virtual keyboard, comprising
2 *app* means for sensing typing gestures made without any real
3 keyboard; and
4 means for producing, from the sensed typing gestures,
5 gesture associated textual output.

1 *Sub* 18. A system according to Claim 17, wherein the typing
2 *app* gestures are made by a person, and further comprising

